
## CUT GLASS AND CRYSTAL.—I.

By Hester M. Poole.

TO THE manufacture of glass has been brought great scientific skill and artistic ability. A few years ago glass was far less popular among our country-people than it is to-day. Many articles for the toilet and table service which were then made of china or silver, are now chosen from a variety of charming models of crystal or cut glass. In fact, glass and silver united in one piece, the latter in filigree designs as a standard for the former, are among the most sumptuous of modern furnishings. Cut glass was formerly for the few. Since its manufacture has been greatly extended in this country, it is now within the reach of a greater number. In common use the pressed and the blown glass take no mean place among the products of science. They are now made so delicate, clear and sparkling that the better specimens are not to be lightly esteemed. Among them are those thin tumblers that by the sand-blast process of engraving are decorated with a multitude of designs, such as arabesques, flowers and monograms.

Venetian glass is still imported, together with a large quantity of Carlsbad ware. Some of it seems too fragile for use, and is better fitted for the cabinet than the table. Our own factories are rivalling their best work. In fact, a visit to any of the large glass establishments in our cities will convince the most conservative person that American cut glass is the finest in the world.

Among the most curious collections of almost all museums are those of ancient glass. Specimens of the period of Queen Hatasu exist which were fused no less than thirty-five centuries ago. The Phœnicians, to whom some historians attribute its invention, about the same time, produced objects of use and more or less beauty. Under the Pharaohs the Egyptians manufactured small opaque articles, usually for adornment, such as vases, beads and glass for inlaying. In tombs have been found tear-bottles, vases, and imitations of precious stones, such as turquoise, emerald, jasper, onyx and lapis lazuli. Although unknown in the days of Homer, it is certain that some glass was made in Greece as long ago as 500 B. C., and that the body of the Great Alexander reposed in a coffin of the same material.

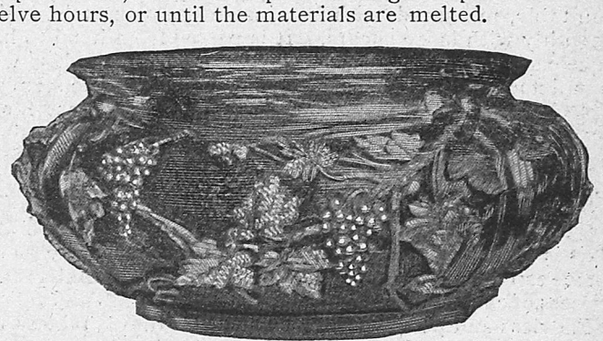
In fact, the development of glass-making is coincident with the growth of ease and comfort. When we think of the condition of dwelling-houses before the manufacture of window-glass, we are able to realize the great strides made by the introduction of modern improvements. Even when, thirteen centuries ago, the art of glass-making was introduced into Venice, those transparent panes that are now used in the poorest cabin were unknown. It was not until shortly before the discovery of America that colored glass came into vogue, followed by the invention of the enameled and gilded, the crackled and variegated, and finally by engraved glass, a long step from the first crude fusion of silica and the salts of Sodium.

In England not even window-glass came into common use until about four centuries ago. With all the splendor of dress and jewels of Queen Bess, the poorest herdsman on the Western prairie could outvie her in enjoying, in his lowly cabin, the unfiltered beauty of the summer sunshine.

But there is glass and glass. A coarse bottle, the commonest kind produced, illy compares with that bit of aerial and iridescent material that, resulting from the melting of perfect materials and from skilled workmanship expended upon it, is known under the name of cut glass. Than these two extremes, nothing more perfectly illustrates the evolution of the industrial arts from their laboriously produced beginnings.

To a citizen of the United States is due the invention of pressed glass, the material in common use. The facility with which it is turned out by machinery greatly reduced the price of ordinary objects in the household and in the arts and sciences. The simpler forms of cut glass are more or less perfectly imitated. But the sharp, highly polished facets of the latter are really far beyond the perfection of any machine. There are some things beside voting that a soulless piece of mechanism fails to do.

In the manufacture of glass, the melting pots in which the ingredients are fused are of the first importance. They are moulded by hand out of the finest clay. As they are ruined by the heat in a few weeks, their renewal adds to the expense, which must be charged to the cost of glass. Each is worth from thirty to fifty dollars. After, with great labor, they are made, ripened and annealed, these melting pots are removed to the furnace. There they are filled with fine, sifted sand or silicate, with a small proportion of oxide of lead and pearl ash. The doors are closed with fire clay to prevent the escape of heat, which is kept to the highest point for ten or twelve hours, or until the materials are melted.



Punch Bowl in Crystal. Decorated with Grape Vine and Fruit in Silver.

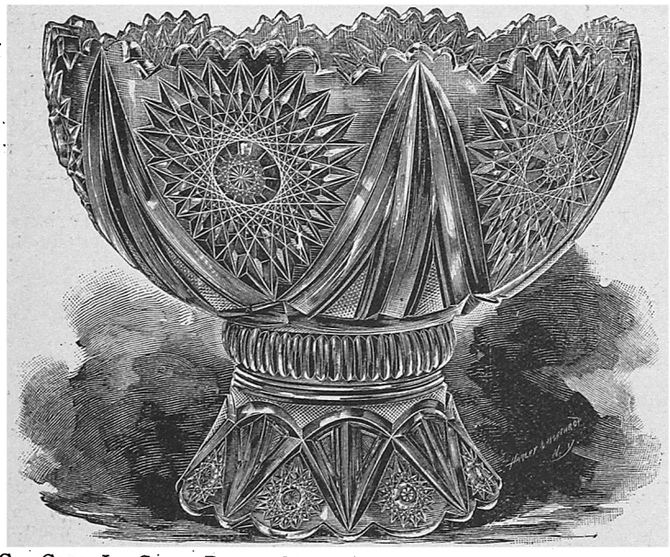
Upon a reduction of the heat, the top of the molten glass is removed, like other similar scums, by a skimmer, a work requiring great care and experience. The skimmer deals with a material boiling at white heat with inconceivable fury, so that all that is perceptible is a blinding glare. When the skimming is done, only the first process of glass-making is finished.

And now, around these crucibles, holding more than a ton's weight, gather brawny workmen. Each has his "blow-pipe," a rod of iron six feet long and pierced from end to end. The "gatherer," as he is termed, dips the blow-pipe into the glowing mass and, turning it round and round, gathers as much of the vessel's mass as he needs for the object to be made. By long experience he can tell, within an ounce, how much that should be.

The glass, cooled to a thick, silvery-looking mass, about the substance of molasses candy when about to be pulled, takes shape as the operator gently blows down the tube, until the bulb is properly distended. As he swings it to and fro to be

either cooled or re-heated at the furnace, the glass is a pear-shaped bubble, changing from a translucent white to a glowing red. Then he passes the tube to a workman upon his left, who places it upon a plate of polished iron and swiftly rolls it until it takes the shape he desires.

If the result is to be a bottle, the glowing glass is inserted into a mould of brass or iron, made in two pieces. When this is closed he blows down the pipe, and the distended bottle, taking the shape of the mould, is finished, with the exception of the neck, which is formed by adding a fresh piece of glass. In this way bottles are made as fast as the description of the process can be written.



CUT GLASS ICE CREAM BOWL. MANUFACTURED BY C. DORFLINGER & SONS, NEW YORK.

If the operator desires to make a goblet, for instance, the work is similarly done and with marvellous swiftness. The blown bubble at the end of the pipe is patted gently on the iron table, measured with iron instruments and trimmed off smoothly with large shears. It is passed from hand to hand, since each has a certain share of the work. The last workman detaches the unfinished goblet by tapping the stem with a piece of wet iron, affixes to it a piece of hot glass for the base, which, with wondrous dexterity, is whirled and flattened into shape, until from the first formless mass is evolved a perfectly formed goblet.

So much for the process that gives the first form of the goblet made out of the finest materials by practiced operators. This is called flint glass, and is as transparent as such a substance can be made. But, skilled as are these manipulators, the process of cutting the surface is still more difficult and delicate.

Flawless and perfect must be the glass that is taken to the shop for cutting. It first passes to the draughtsman, who, by the help of a compass, marks upon its surface the selected pattern. These lines are then traced by means of a camel's-hair brush dipped in whiting, whence it goes into the hands of the cutter. Patterns to be used upon glass are drawn both in miniature and in full size, and preserved in large folios. One firm alone keeps more than six thousand of such drawings.

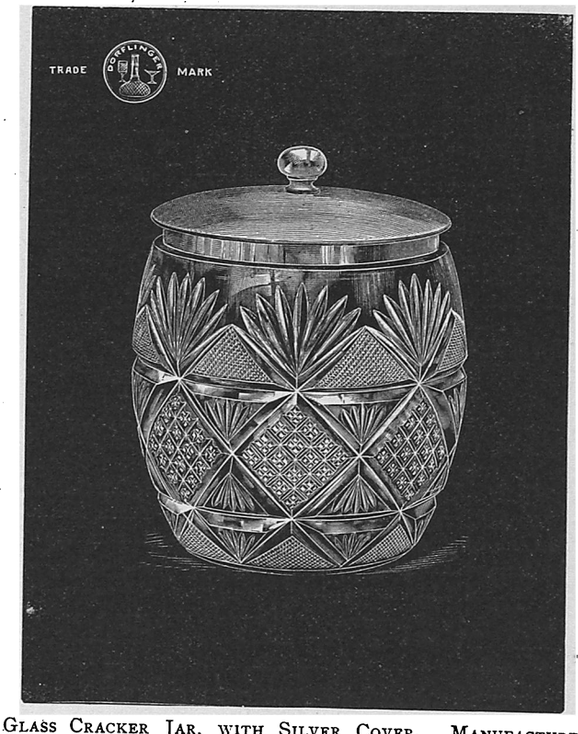
Following the goblet, if such be the article, into the cutting-room, we enter an immense apartment. Overhead are revolving bands, and on either side of the well-lighted room revolve swiftly wheels of wood and iron whose sharp teeth cut the facets that call forth such admiration. Each wheel is from one to three feet in diameter, and beside it stands a skilled workman, wearing cap and blouse. Beneath is a trough partially filled with wet sand or emery, and in front stands a lad whose occupation is to swab the glass with a brush dipped into the trough, to prevent breakage. In spite of this precaution many a beautiful article in some stage of the process flies into pieces in the hands of the careful workman. Perhaps it is a bowl or vase just receiving the final touches, after weeks of patient labor, when all the pains, experience and attention go for naught, while the pieces are again thrown into the melting pots.

All this per cent. of breakage goes into estimates of cost of production, thus greatly raising it from what it would be without such fragility of material. This should be borne in mind by the purchaser who complains of the costliness of this most beautiful of all the accessories of the table. At present there seems no way of lessening the liability of breakage.

Meanwhile we have left the boy to his monotonous task of feeding the first cutting-wheel with its damp and gritty food. The edge of the wheel is sloped at the precise angle of the edge of the focus; thus the latter is cut to the proper depth and form by the workman, who, holding the goblet in hand, applies it to the swiftly moving wheel, and turning it from side to side as needed. When he passes the goblet to the second workman, who uses a wheel of stone in place of iron, it is merely a rough, translucent mass. It goes to a third cutter, whose wooden wheel is fed by his attendant with pumice stone, so that when it leaves the hand of the third skilled polisher it has for the first time attained a transparent condition.

But the end is not yet. As the finest characters are often made by repeated experiences, so the beauty of glass is educed by a repetition of grinding and smoothing.

Held in front of a revolving brush, which at every turn dips into pumice stone and water, every portion of the glass, untouched by the previous processes of cutting, is made smooth, though it still lacks those prismatic qualities that make it almost rival the diamond. This is produced by the final process, in which the goblet is held against another soft revolving brush, which is continually wet with putty and water. The peculiar qualities of the oil and whiting of the putty, together with the gentle polish of the brush, educes that brilliance that is the pride of the housewife who is fortunate enough to possess fine specimens of cut glass.




CUT GLASS CRACKER JAR, WITH SILVER COVER. MANUFACTURED BY C. DORFLINGER & SONS, NEW YORK.

That the work of cutting requires delicacy and the utmost degree of careful experience, after one has followed the goblet from wheel to wheel, demands no proof. Should there be an unsuspected flaw in the glass, or should the boy who feeds the wheel for one single moment forget his duty, then the crystal will fly to pieces in the hand of the workman. The goblet must not be divested of moisture one second, neither must there be the least carelessness on the part of the polisher or the smoother. A moment's inattention and the labor of weeks or months lies in fragments at his feet. And even this care is fruitless unless the finest materials, perfectly fused, are furnished in the beginning. Every process multiplies the hazard of production.